Tennessee Tech University  
Data Concept Review

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| Name: Sherri Wade  Date: April 11, 2013 Lesson Title: Mean, Mode, Median, and Range Concept Review Grade/Level: 5th Grade |
| Curriculum Standards |
| *State/Common Core Curriculum Standards*  Math Common Core Curriculum Standards  5.MD Represent and Interpret data.  5.SP Develop understanding of statistical variability  5.SP.3 Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.  Tennessee Math Standards  Data, Probability and Statistics  GLE 0506.5.1 Make, record, display and interpret data and graphs that include whole numbers, decimals, and fractions.  SPI 0506.5.1 Collect, record, arrange, present, and interpret data using tables and various representations.  SPI 0506.5.3 Given a set of data or a graph, describe the distribution of the data using median, range, or mode.  Tennessee Technology Standards  Standard 1.0 Students will understand basic operations and concepts of technology.  SPI 0506.5.1b. Obey the copyright laws and accurately record information source. |
| Focus Questions/Big Idea/Goal (List all 3) |
| Focus Question: How do you compute and compare simple examples to show that they may differ by knowing how to use the concept of means, median, range, and mode?  Big Idea: Students can compute the mean, median, mode, and range of a set of data and interpret the results.  Goal: Student can find the mean, median, mode, and range of data sets. |
| Lesson Objective(s) |
| Students will know the definitions of mean, median, range, and mode.  Students will be able to compute the given sets of data and compute the mean, median, mode, and range. |
| Vocabulary/ Academic Language |
| 1. Mean- is the adding up the different values and divides the data by the total number of groups. 2. Mode- the data value that occurs most often in the data set. 3. Median- it is the middle number of the set after it is put in numerical order if odd. If it is an even number it is the average of the two numbers. 4. Range- is the difference between the greatest and least values in the set of data. (Substrate the smallest value from the largest value). |
| Material/Resources |
| * Math Concept Worksheets * Skittles * Skittle Worksheet * Pencils * Calculator * Whiteboard * Video from Envision Series – * Graphic Organizer sheets (mean, median, mode, and range) * Math notebook * Glue * Scissor |
| Assessment/Evaluation |
| **Formative***: How will students demonstrate understanding of lesson objective(s)? How will you monitor and/or give feedback?*  Students will work on individual worksheets in small groups with the teacher and turn-in the worksheets for a grade. Teacher will allow the students to partner check their answer. The teacher will assess for feedback during the lesson to see if everybody understands the lesson.  **Summative:** *What evidence will you collect and how will it document student learning/mastery of lesson objective(s)*  Students will be given sets of numbers (data), and compute the mean with 80% accuracy. An exit ticket will be used to answer a question where the student has to use the four different concepts to solve it. |

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| Instruction  (Include a suggested time for each major activity) | List Questions for higher order thinking *These cannot be answered by yes or no.*  (Identify Bloom’s Level of Thinking) |
| Set/Motivator: **Time: 10 minutes**  Hold up one bag of Skittles. Have the students estimate the number of pieces of candy for each color before opening the bag.  Watch the video from Envision. | Comprehension: Estimate how many Skittles are in the bag?  Evaluating: What is the difference between a guess and an estimate? |
| Instructional Procedures/Learning Tasks**:** **Time: 60 minutes**   1. The students will watch the Envision video on “Mean, Mode, Median, and Range. 2. The teacher will demonstrate the following terms: mean mode, median, and range for the students on the whiteboard. 3. Example Table A  |  |  |  |  |  | | --- | --- | --- | --- | --- | | red | purple | green | pink | blue | | 10 | 10 | 13 | 10 | 16 |  1. Introduce and define mode. 2. Have the students place the example of mode and the definition in their math notebook. Example from the table A “10” is the mode. 3. The teacher will show the students how to find the mode on the whiteboard. 4. Tell the students that there can be more than one mode. 5. Introduce and define mean (average). 6. Have the students place the example of mean and definition in their notebook. “12” is the mean from the table A. 7. The teacher will show the students how to find the mean (average) on the whiteboard. 8. Introduce and define the median. 9. Have the students place the example of median and the definition in their math notebook. Example from the table A “10” is the median. 10. The teacher will show the students how to find the median on the whiteboard. The teacher will show the students the way to find the median with an odd number sets or an even number sets. 11. Introduce and define the range. 12. Have the students place the example of the range and the definition in their math notebook. Example from the table A “6” is the range. 13. The teacher will show the students how to find the range on the whiteboard. 14. The students will place in their math notebook the graphic organizer terms as the teacher talk about each term. 15. Students will work in a group of 2-6 students to complete the assignment. 16. The teacher will pass-out the Skittles and worksheets to complete after the demonstration part of the lesson. 17. Teacher will tell the students do not eat the candy until the teacher tells them too. 18. Have students estimate the bag of Skittles before opening the bag and record estimate on the Skittle worksheet. 19. The teacher will make a table and record their estimate answers on the board to review the lesson of the day. 20. Have the students open the bag and sort the candy by color. 21. Students will divide, count, and record how many pieces of candy are in each color. 22. Students will find the mode of the given set of candy. 23. Tell the students you want to know the mean of the bag use the different colors to find the mean quickly. 24. Find the median of the bag of Skittles. 25. The students will find the range of the bag of Skittles. 26. After the whole-class lesson, the students will break into small math groups to work on their individual worksheets. | Evaluating: Which pile ranks the least/most?  Evaluating: Does any groups have the same amount?  Knowledge: What is the definition of mode?  Analyzing: Why would you have more than one mode?  Knowledge: What is the definition of mean?  Knowledge: What is the definition of median?  Analyzing: How do you find the median if you have even numbers?  Knowledge: What is the definition of the range?  Evaluating: Why is finding the range important? (It tells you how close or far apart your data values are. If you have a small range your data values are close together. If you have a large range your data values vary by a greater amount).  Analyzing: What was the hardest part of the problem?  Comprehension: Can data be described by one number? If yes, how can data be described by one number? (Mean or average)  Comprehension: What does it mean to be the middle data value? (The number in the middle is two below or three above the data value.)  Application: How many numbers are above “16”? One. So by looking at the data will the average be greater than or less than “16”? (Your average will not be larger than “16”.)  Evaluate: Why do you say that?  Application: How many numbers are below “10”? None. so will the average be greater than or less than  “10” your average will not be smaller than “10”.  Evaluate: Why do you say that? |
| Closure: **Time: 20 minutes**  Review the meaning of mean, median, mode, and range and how to find each of them from the estimates data collected from the students during the instructional part of the lesson. Students can eat the candy after presentation/ lesson. Students will work in small groups and do the worksheets on the lesson. | Evaluating: What other data I can use to create a problem to solve for the mean, median, mode and range? |

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| Adaptations to Meet Individual Needs:  ELL students will work in a group with the other students. The teacher will work closely with the student in small group lesson for understanding. There is no modification for doing the math lesson.  SPED student- The student will follow their IEP during the lesson. The student will have more time to complete their worksheet.  Spatial-visual intelligence- Students will use graphic organizers to grasp the math concept.  Interpersonal intelligence- Students will work with each other effectively in order to solve the mathematical problems.  Intrapersonal intelligence- Students will work independently to complete their individual worksheets.  Logical-mathematical intelligence- Students will analyze problems logically, carry out mathematical operations, and investigate issues scientifically.  Management/Safety Issues:  Teacher will address anyfood allergies and use an alternate way to find the mean, mode, range, and median. The teacher will use different color buttons to address any child with food allergies. |
| Rationale/Theoretical Reasoning: The rationale for the lesson is to demonstrate an understanding of how to find the mean, mode, range, and median using their data from the Skittles lesson. Students will calculate the mean with several different types of data including birthdays, scores, and temperatures to get the understanding that you can use any type of data and find the average of it. Through Dewey’s theory of progressivism, the teacher is able to present a problem to the students and the students gather data to test and solve for a conclusion to the problem that was presented to them. Through the use of the advance organizers at the beginning of a lesson, the students will be able to focus on the important content to come in the lesson. Also, it allows the students a way to relate concepts in the instructional material to elements of that lesson. |
| References:   * Kerr, A. (2013), “Mean Median, Mode, and Range Graphic Organizer”. Retrieved on Apr. 8, 2013 from <http://www.fortheloveofteachingmath.com/2013/02/11/mean-median-mode-and-range-graphic-organizer-freebie/>. * Xu, K., Cortez, J., Chang, C., Harkins, C., & Rosecrans, C. (2006). “Mean, Median, Mode Lesson Plan”. Retrieved on Mar. 19, 2013 from <http://mrrosecrans.com/New%20files/Documents/ELD%20Group%20Lesson/3-3meanmedianandmode_ELD.pdf>. * Martin, P. “Graphic Organizer’s Clip Art”. Retrieved on Mar. 19, 2013 from <http://www.pppst.com/clipart.html>. |
| Reflections/Future Modifications:*To what extent did the class learn what you intended them to learn? What will be your next steps instructionally? What did you learn about your students as learners? What have you learned about yourself as a teacher?*  The students were able to learn the lesson I taught them through the use of candy. They were able to understand that if you were trying to find the mean that the mean would not be larger than or greater than the largest number in the set of numbers in the problem or smaller or less than the smallest number in the problem. The nest step in the instructionally is to have the students use the data to create different types of graphs. What I learned about my students is that they are willing to learn when they have different variety of ways to learn a lesson. They were willing to give me a lot of feedback on how I could have made the lesson better. When I make worksheet to make sure I remove unnecessary lines, because it was confusing for the students when it came time for them to record their answers on the Skittles worksheet. What I learned about myself as a teacher was to manage your time for the instructional phase and the hands-on phase of the lesson. I was able to complete my lesson plan in the set time frame with time to help the students on one to one bases. |

Math - Problem Solving : Mean, Mode, Median and Range

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Teacher Name: Ms. Wade

Student Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| CATEGORY | 4 | 3 | 2 | 1 |
| Mathematical Concepts | Explanation shows complete understanding of the mathematical concepts used to solve the problem(s). | Explanation shows substantial understanding of the mathematical concepts used to solve the problem(s). | Explanation shows some understanding of the mathematical concepts needed to solve the problem(s). | Explanation shows very limited understanding of the underlying concepts needed to solve the problem(s) OR is not written. |
| Working with Others | Student was an engaged partner, listening to suggestions of others and working cooperatively throughout lesson. | Student was an engaged partner but had trouble listening to others and/or working cooperatively. | Student cooperated with others, but needed prompting to stay on-task. | Student did not work effectively with others. |
| Mathematical Terminology and Notation | Correct terminology and notation are always used, making it easy to understand what was done. | Correct terminology and notation are usually used, making it fairly easy to understand what was done. | Correct terminology and notation are used, but it is sometimes not easy to understand what was done. | There is little use, or a lot of inappropriate use, of terminology and notation. |
| Neatness and Organization | The work is presented in a neat, clear, organized fashion that is easy to read. | The work is presented in a neat and organized fashion that is usually easy to read. | The work is presented in an organized fashion but may be hard to read at times. | The work appears sloppy and unorganized. It is hard to know what information goes together. |
| Checking | The work has been checked by two classmates and all appropriate corrections made. | The work has been checked by one classmate and all appropriate corrections made. | Work has been checked by one classmate but some corrections were not made. | Work was not checked by classmate OR no corrections were made based on feedback. |
| Strategy/Procedures | Typically, uses an efficient and effective strategy to solve the problem(s). | Typically, uses an effective strategy to solve the problem(s). | Sometimes uses an effective strategy to solve problems, but does not do it consistently. | Rarely uses an effective strategy to solve problems. |
| Completion | All problems are completed. | All but one of the problems are completed. | All but two of the problems are completed. | Several of the problems are not completed. |

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_

Skittles Worksheet

|  |  |
| --- | --- |
|  | Answer |
| Estimate |  |
| Mean |  |
| Mode |  |
| Median |  |
| Range |  |

Before activity, have students work in groups of 2-6. Give group of students a mini pack of Skittles and the activity sheet (see above). Remind students not to eat them before or during the activity.

Instructions:

1. First estimate how many Skittles are in the bag before opening the bag and write down the estimate/guess on the worksheet. We will see which group has the close estimate. The teacher will ask for the estimates from each group to record the estimates on the board.
2. Open the pack, separate colors, count the number of each color, record data in the second column on your activity sheet.
3. Share the data with your group members and record the data on your sheet to turn-in at the end of the lesson as well.
4. Use the data recorded to find the mean, median, mode and range.
5. Compare your answers with your group members.
6. Students can eat the Skittles after the lesson.

Mean, Mode, Median, and Range Worksheet 2013

Graphic Organizers for the Math Notebook



Mean- (Also called “average.”) Add all of the numbers together. Then divide that sum by the total number of numbers.

Example:

3+3+4+6+7+7+7+8+9 = 54

(9 numbers were added together, so divide the sum by 9.) 54/9 = 6



Median- “**Middle”** number. List numbers from least to greatest. Then do the slashes dance. If you have an even number in the middle take the two numbers, then add and divide them by two to get the median.

Example:

3, 3, 4, 6, 7, 7, 7, 8, 9 = 7 is the median.

3, 3, 4, 6, 7, 7, 7, 7, 8, 9 = 7 and 7 is the median, so add the two and divide.

7+7 =14 14/2 = 7

Mode- “**Most”** frequent number. It is the most frequent number in the set.

Example:

3, 3, 4, 6, 7, 7, 7, 8, 9 = 7 is the most frequent number in the set.



Range- (largest–smallest). – It is the difference between the greatest and least values in the set of data. (Substrate the smallest value from the largest value to get the range).

Example:

3, 3, 4, 6, 7, 7, 7, 8, 9

9 – 3 = 6, so 6 is the range.



Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Graphic Organizer Worksheet

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| Word to Know | Definition | Example | How to Solve |
| Mean |  | Find the mean for:  80, 95, 70, 60, 100, 85, 0, 100 |  |
| Median |  | Find the median  10, 15, 8, 20 |  |
| Find the mode  50, 60, 70, 40, 30 |  |
| Mode |  | Find the mode  17, 15, 10, 20, 15, 17, 18, 15 |  |
| Range |  | Find the range of  60, 100, 80, 95 |  |

Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Mean, Median, Mode, and Range

Find the mean, mode, median, and range for each set of numbers.

1. 3, 4, 9, 7, 7 mean: \_\_\_\_\_\_ b. 15, 3, 3 mean: \_\_\_\_\_\_

median: \_\_\_\_\_ median: \_\_\_\_\_

mode: \_\_\_\_\_ mode: \_\_\_\_\_\_

range: \_\_\_\_\_\_ range: \_\_\_\_\_\_

c. 3, 0, 0, 2, 0 mean: \_\_\_\_\_\_ d. 5, 6, 2, 4, 5, 1 mean: \_\_\_\_\_\_

median: \_\_\_\_ median: \_\_\_\_\_

mode: \_\_\_\_\_ mode: \_\_\_\_\_\_

range: \_\_\_\_\_ range: \_\_\_\_\_\_

e. 10, 6, 3, 10, 1 mean: \_\_\_\_\_\_ f. 4, 6, 2, 6, 9, 3, 5 mean: \_\_\_\_\_\_

median: \_\_\_\_\_ median: \_\_\_\_\_

mode: \_\_\_\_\_ mode: \_\_\_\_\_\_

range: \_\_\_\_\_\_ range: \_\_\_\_\_\_